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President Reagan's recent proclamation of a 200 mile Exclusive Economic Zone (EEZ) has again called attention to the United States' desire to exploit the abundant natural resources of the continental shelf. U.S. fishery policy has focused on the full utilization of the fishery resources found within the 200 mile limit since the passage of the Magnuson Fishery Conservation and Management Act of 1976 (FCMA). Because most commercially important species are being fished at the maximum sustainable yield (MSY), there has been an increased emphasis on the development of new species -- the so-called "underutilized species".

Foreign fishing fleets have played a prominent role in initiating the development of underutilized species. Their success in harvesting, processing, and marketing these species clearly demonstrates that profitable commercial opportunities are available to U.S. fishermen. U.S. fishery management agencies are working diligently to promote the expansion of domestic harvesting and processing capacity to enable our fishing industry to take advantage of these developing opportunities.

Joint ventures are one tool being used by Regional Fisheries Management Councils to aid in the transition to a fully functional domestic fishing industry. Joint ventures are designed to enable U.S. fishermen to gain valuable experience in harvesting underutilized species and to aid in the transfer of fishing technology from foreign fishermen. In addition, they permit foreign governments to gradually phase out their fishing operations in the fishery conservation zone

(FCZ) while maintaining an adequate supply of fishery products. The regional councils believe that these partnerships are an intermediate stage in the gradual evolution of domestically owned and operated fishing companies.

There is considerable debate over the use of joint ventures as a method to increase our ability to exploit underutilized species in the FCZ. It is beyond the scope of this paper to address all of the issues involved in the controversy. We have chosen instead to focus on an issue of primary interest to U.S. fishermen and fishery managers: the expected return to the joint venture harvesting vessel.

The purpose of this analysis is to compare the expected returns of a U.S. flag vessel fishing independently for squid to those of a U.S. vessel fishing for squid in a joint venture arrangement. The report will aid fishermen in deciding whether or not to target squid as a part of their total fishing effort. Additionally, if squid is targeted, each fisherman will be able to determine which option is best for him -- fishing independently or in a joint venture group. Resource managers will be able to use the information as one element in the total decision matrix as they try to determine the best policy for the development of the U.S. squid resource.

Assumptions

I. Independent Fishing Vessel

A) It is assumed that the vessel will have a seven day turnaround, i.e. it will complete a fishing trip, return to port to off load and be ready to sail every seven days.

B) During each seven day trip 4 days will be spent harvesting squid.

C) The sixty foot vessel will be manned by 4 individuals including a captain. (90'-10 men)

D) The sixty food vessel will cost approximately $400,000 (90' - $1,100,000). This figure includes all electronics and fishing gear.

E) The vessel will be financed over 20 years at 12%. It is assumed that owner's equity will be 20% or $80,000. (90' - $220,000).

F) Fuel consumption for the 60' vessel is estimated at 250 gallons per day at $1.00 per gallon. (90' - 350 gallons per day). The independent vessels have been assessed a surcharge equal to day of fuel usage per fishing trip. This surcharge has been assessed to account for more extensive travel to and from the fishing grounds and the fact that these vessels will have to carry their catch on board while fishing and traveling to port.

G) Food is estimated at $7.50 per man per fishing day.

H) Ice has been estimated at 9 tons per trip at $25 per ton for the 60' vessel. (12 tons per trip for the 90' vessel)

I) Crew share is 30% of the modified gross revenue. Modified gross revenue is the gross revenue less the fuel, ice, and food expenses.

J) Insurance is estimated at 2.5 percent of the original hull cost and $1000 per man on an annual basis.

K) Maintenance and repair costs are estimated at 8 percent of the hull cost on an annual basis.

L) General and Administrative Expenses (G&A) is estimated at 2.5% of gross revenues. This expense will cover professional fees, interest on working capital, office expense, miscellaneous expenses, etc.

M) Total fishing days are estimated in the following manner.

1) Each month is assumed to have 30 days.

2) The total number of months dedicated to squid fishing are multiplied times 30 to days give you the total available fishing days in the season.

3) The total number of fishing days is divided by the total days it takes to complete a fishing trip. (i.e.-7 days for an independent vessel). This indicates the total number of expacted trips in a season.

4) The total number of trips is multiplied times the number of fishing days per trip (i.e. 4 days for the independent vessel). This gives the total number of fishing days per season.

5) The total number of fishing days has been reduced by five percent to reflect the fact that the vessel may experience mechanical difficulties or poor weather conditions. This is an addition to normal port time allocated in the fishing plan.

N) The vessel will receive $.35 per pound for Loligo and $.15 per pound for Illex.

O) Docking fees are not assessed to independent fishermen because it is assumed that the onshore processor will provide temporary dock space as is the tradition in the Mid-Atlantic Region.

P) Utility and phone expense is estimated at $75 per month.

Q) Vehicle fuel and maintenance expense is estimated at $150 per month.

R) Supply expense is estimated at $100 per month.

S) Captain/owner's salary is provided at $40,000 per year. This wage covers all living expenses and taxes.

T) The Break-even Point is calculated by using the following equation:

$$BEP = \frac{\text{Total Variable Expenses (Less Crew Share)} + \text{Total Fixed Expenses}}{1 - \text{Crew Share}}$$

The Break-even Catch is calculated by using the following equation:

$$BEC = \frac{BEP}{\text{Price Per Lb. Of Squid}}$$

The Break-even Catch Per Fishing Day is calculated using the following formula:

$$BEC/FD = \frac{BEC}{\text{Total Number Of Available Fishing Days In A Season}}$$

U) Depreciation was estimated using a 10 year expected ife and the straight line depreciation method. New vessels would be expected to use the new ACRS depreciation schedules currently in effect. These accelerated depreciation techniques tend to distort revenue projections so I have chosen to use the straight line method to give projections that are constant over time.

V) All returns are estimated before tax due to the wide variation in tax rates experienced by fishermen in the Mid-Atlantic region.

W) It is assumed, that all vessels will fish for 10 hours per day.

II. Joint Venture Vessel

A) Joint venture assumptions will remain the same as independent fishing assumptions except as noted.

B) Joint venture vessels will fish on a 14 day rotation. There will be 10 fishing days and 4 days off for travel, off loading and restocking the vessel.

C) It is assumed that the joint venture vessels will not require ice on board because cod ends will be off loaded directly onto the mother ship and freezer space will be adequate for 10 days of food provisions.

D) Vessel and gear maintenance expense is estimated at 7% to account for less wear and tear on vessel due to fewer trips to port and the fact that the vessel will not have to carry it's catch on board.

E) Joint venture vessel are projected to receive $.125 per lb. for Illex squid and $.30 per lb. for Loligo squid.

Independent Vessel
(Loligo Squid - $.35/lb-3 months)

Length of Vessels	60'		90'	
lbs/day	5000	10000	10000	20000
lbs/season	245000	490000	490000	980000
Gross Revenue	85750	171500	171500	343000
Variable Expenses				
Fuel	13875	13875	19425	19425
Ice	2925	2925	3900	3900
Food	1472	1472	3680	3680
Vessel & Gear Maintenance	8000	8000	22000	22000
Vehicle Fuel & Maintenance (Support Vehicle)	450	450	450	450
Supplies	300	300	300	300
Crew Share	20243	45968	43349	94799
Total Variable Expenses	47265	72990	93104	144554
Total Variable Expenses (Less Crew Share)	27022	27022	49755	49755
Fixed Expenses				
Vessel Payment	10700	10700	29455	29455
Insurance	3500	3500	8875	8875
Docking	0	0	0	0
Utilities and Phone	225	225	225	225
G&A	2150	4300	4275	8575
Depreciation	10000	10000	27500	27500
Captain/Owner's Salary	10000	10000	10000	10000
Total Fixed Expenses	36575	38725	80330	84630
Total Expenses	83840	111715	173434	229184
Gross Revenue	85750	171500	171500	343000
(less) Total Expenses	83840	111715	173434	229184
Net Profit Before Tax	1910	59785	(1934)	113816
Return on Owner's Equity Before Tax	2%	74.73%	-	51.7%
Break Even Point ($)	90853	93929	184407	191979
Break Even Catch (lbs.)	259579	268355	526878	548510
Break Even Catch/Fishing Day	5298	5477	10753	11194

Independent Vessel
(Loligo Squid - $.35/lb)

Cash Flow Analysis

Length of Vessels	60'		90'	
lbs/day	5000	10000	10000	20000
Gross Revenue	85750	171500	171500	343000
Total Variable Expenses	47265	72990	93104	144554
Total Fixed Expenses	36575	38725	80330	84630
Total Expenses	83840	111715	173434	229184
Net Profit Before Tax	1910	59785	(1934)	113816
Depreciation	10000	10000	27500	27500
Total Cash Inflow Before Tax	11910	69785	25566	141316

Joint Venture Vessel
(Loligo Squid - $.30/lb-3 months)

	60'		90'	
lbs/day	5000	10000	10000	20000
lbs/season	330000	660000	660000	1320000
Gross Revenue	99000	198000	198000	396000
Variable Expenses				
Fuel	16500	16500	23100	23100
Ice	0	0	0	0
Food	1980	1980	4950	4950
Vessel & Gear Maintenance	7000	7000	19250	19250
Vehicle Fuel & Maintenance (Support Vehicle)	450	450	450	450
Supplies	300	300	300	300
Crew Share	24156	53856	50985	110385
Total Variable Expenses	50386	80086	99035	158435
Total Variable Expenses (Less Crew Share)	26230	26230	48050	48050
Fixed Expenses				
Vessel Payment	10700	10700	29455	29455
Insurance	3500	3500	8875	8875
Docking	300	300	300	300
Utilities and Phone	225	225	225	225
G&A	2475	4950	4950	9900
Depreciation	10000	10000	27500	27500
Captain/Owner's Salary	10000	10000	10000	10000
Total Fixed Expenses	37200	39675	81305	86255
Total Expenses	87586	119761	180340	244690
Gross Revenue	99000	198000	198000	396000
(less) Total Expenses	87586	119761	180340	244690
Net Profit Before Tax	11414	78239	17660	151310
Return on Owner's Equity Before Tax	14.3%	97.8%	8.0%	68.8%
Break Even Point ($)	90614	94150	184793	191864
Break Even Catch (lbs)	302047	313833	615976	639548
Break Even Catch/Fishing Day	4576	4755	9333	9690

Joint Venture Vessel
(Loligo Squid - $.30/lb)

Cash Flow Analysis

Length of Vessel	60'		90'	
lbs/day	5000	10000	10000	20000
Gross Revenue	99000	198000	198000	396000
Total Variable Expenses	50386	80086	99035	158435
Total Fixed Expenses	37200	39675	81305	86255
Total Expenses	87586	119761	180340	244690
Net Profit Before Tax	11414	78239	17660	151310
Depreciation	10000	10000	27500	27500
Total Cash Inflow Before Tax	21414	88239	45160	178810

Independent Vessel
(Illex Squid - $.15/lb-4 months)

Length of Vessels	60'		90'	
lbs/day	5000	12000	10000	25000
lbs/season	325000	780000	650000	1625000
Gross Revenue	48750	117000	975000	243750
Variable Expenses				
Fuel	18250	18250	25550	25550
Ice	3600	3600	4800	4800
Food	1950	1950	4875	4875
Vessel & Gear Maintenance	10666	10666	29333	29333
Vehicle Fuel & Maintenance (Support Vehicle)	600	600	600	600
Supplies	400	400	400	400
Crew Share	8450	27960	18683	62558
Total Variable Expenses	43916	63426	84241	128115
Total Variable Expenses (Less Crew Share)	35466	35466	65558	65558
Fixed Expenses				
Vessel Payment	14267	14267	39273	39273
Insurance	4667	4667	11833	11833
Docking	0	0	0	0
Utilities and Phone	300	300	300	300
G&A	1225	2925	2440	7000
Depreciation	13333	13333	36667	36667
Captain/Owner's Salary	13333	13333	13333	13333
Total Fixed Expenses	47125	48825	103896	108456
Total Expenses	91041	112251	188137	236571
Gross Revenue	48750	117000	97500	243750
(less) Total Expenses	91041	112251	188137	236571
Net Profit Before Tax	(43916)	4749	(84241)	7179
Return on Owner's Equity Before Tax	-	5.9%	-	3.3%
Break Even Point ($)	117987	120416	242077	248591
Break Even Catch (lbs.)	786581	802773	1613848	1657276
Break Even Catch/Fishing Day	12101	12350	24828	25496

Independent Vessel
(Illex Squid-$.15/lb)

Cash Flow Analysis

Length of Vessel	60'		90'	
lbs/day	5000	12000	10000	25000
Gross Revenue	48750	117000	975000	243750
Total Variable Expenses	43916	63426	84241	128115
Total Fixed Expenses	47125	48825	103896	108456
Total Expenses	91041	112251	188137	236571
Net Profit Before Tax	(43916)	4749	(84241)	7179
Depreciation	13333	13333	33667	36667
Total Cash Inflow Before Tax	(30583)	18082	(47574)	43846

Joint Venture Vessel
(Illex Squid - $.125/lb.-4 months)

	60'		90'	
lbs/day	5000	12000	10000	25000
lbs/season	425000	1020000	850000	2125000
Gross Revenue	53125	127500	106250	265625
Variable Expenses				
Fuel	21250	21250	29750	29750
Ice	0	0	0	0
Food	2550	2550	6375	6375
Vessel & Gear Maintenance	9333	9333	25667	25667
Vehicle Fuel & Maintenance (Support Vehicle)	600	600	600	600
Supplies	400	400	400	400
Crew Share	8798	31100	21038	68850
Total Variable Expenses	42931	65243	83830	131642
Total Variable Expenses (Less Crew Share)	34133	34133	62792	62792
Fixed Expenses				
Vessel Payment	14267	14267	39273	39273
Insurance	4667	4667	11833	11833
Docking	400	400	400	400
Utilities and Phone	300	300	300	300
G&A	1060	3200	2655	6650
Depreciation	13333	13333	36667	36667
Captain/Owner's Salary	13333	13333	13333	13333
Total Fixed Expenses	47360	49500	104461	108456
Total Expenses	90291	114743	188291	240098
Gross Revenue	53215	127500	106250	265625
(less) Total Expenses	90291	114743	188291	240098
Net Profit Before Tax	(37166)	12757	(83830)	(25527)
Return on Owner's Equity Before Tax	-	15.9%	-	11.6%
Break Even Point ($)	116419	119476	238933	244640
Break Even Catch (lbs)	931349	955806	1911462	1957120
Break Even Catch/Fishing Day	10957	11248	22488	23025

Joint Venture Vessel
(Illex Squid - $.125/lb)

Cash Flow Analysis

Length of Vessel	60'		90'	
lbs/day	5000	12000	10000	25000
Gross Revenue	42500	127500	106250	265625
Total Variable Expenses	42931	65243	83830	131642
Total Fixed Expenses	47360	46820	104461	198456
Total Expenses	90291	114743	188291	240098
Net Profit Before Tax	(47791)	12757	(83830)	(25527)
Depreciation	13333	13333	36667	36667
Total Cash Inflow Before Tax	(34458)	26090	(47163)	62194

Conclusion

This analysis reveals that fishermen involved in joint venture operations realize a higher return on investment than their independent competitors. The advantage results primarily from the joint venture operator's ability to remain at sea for extended periods of time while the independent operator must return to port more frequently to maintain a high quality product for shoreside processors. Because he unloads his catch directly onto foreign processing vessels, the joint venture fisherman is not limited by quality constraints. He is only limited by his ability to store adequate fuel and provisions, as well as his ability to maintain a high level of productivity.

Smaller fishing vesels have a competitive advantage over larger vessels in the squid fishery. Their lower fixed and variable costs permit them to achieve their break-even point at a much lower level of catch. This lower break-even point renders them less vulnerable to cyclical downturns in stock size or changing economic conditions. These factors, coupled with their lower equity requirements and higher expected returns, result in a lower level of risk for smaller vessels operating in the squid fishery.

This report should prove to be a useful tool for industry members as well as those charged with managing the squid resource. It contains baseline information that can be used by fishermen to determine whether they should enter this fishery and if they do target squid, in their decision to fish independently or in a joint venture

group. Resource managers can use the information to help make their decisions concerning future U.S. policy towards joint ventures.